



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/926,402	10/26/2001	Eric Pilat	215245US6XPCT	1644

22850 7590 06/23/2003

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

EDMONDSON, LYNNE RENEE

ART UNIT	PAPER NUMBER
----------	--------------

1725

DATE MAILED: 06/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/926,402

Applicant(s)

PILAT, ERIC

Examiner

Lynne Edmondson

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-12 is/are allowed.
- 6) ☒ Claim(s) 13-15 and 22 is/are rejected.
- 7) ☒ Claim(s) 16-21 and 23-28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 13 -15 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Ference et al. (USPN 5244143).

Ference teaches a method of making solder balls or pads on an electric component the method comprising the injection of molten solder into a guide open at one end wherein the guide is formed by two separable parts, a mold (32) and an injection matrix (34) comprising passages (60, 66, 68) with a narrowing of the guide (upper portion of section 68) at the level of separation of the parts. The parts are separable in the direction of injection. The matrix is separated from the mold while the alloy is still liquid (figures 9-11). The mold may be separated from the solder while the solder is liquid (liquid transfer, col 7 line 48 – col 8 line 16). In another embodiment the mold may be cooled and solidify solder (col 7 lines 1-22). In another embodiment, the mold may be cooled to solidify solder in the mold (col 8 lines 4-28). The liquid solder takes the shape of a ball when cooled (figure 26 and col 8 lines 17-28). A component (50) is positioned in the mold and held by pressure. Liquid solder is injected under pressure (col 5 line 44 – col 6 line 9) which rapidly fills the passages. Liquid is

withdrawn from the matrix into the mold, which is cooler (col 6 line 40 – col 7 line 8).

The component and mold may be separated while the solder is still liquid such that the solder clings to the component and not to the mold (col 8 lines 1-16 and col 8 line 66 – col 9 line 1-16). The separation of the component from the mold reveals solder pads (mounds 122, col 7 lines 9-47) and may be accomplished by a pressure differential (col 10 lines 21-31). An inert gas (nitrogen) saturates the atmosphere of the alloy and passages (col 5 lines 44-58). The guide comprises a mold (32) and matrix (34) with two parallel faces and coaxially aligned passages which are perpendicular to the faces. The passages have a truncated cone shape with a sudden narrowing at the diameter at the level of separation. The holes in both parts have the same diameter (figure 12A). The mold is made of silicon (col 5 lines 29-43).

Response to Arguments

2. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., separation of the mold while the solder is liquid) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Therefore the 102 rejection of claims 13-15 and 22 as anticipated by Ference stands.

Allowable Subject Matter

3. Claims 1-12 are allowed.

4. The following is an examiner's statement of reasons for allowance: The closest prior art teaches the invention essentially as claimed but teaches separation of the mold only after solder solidification. See Ference (USPN 5244143).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

5. Claims 16-21 and 23-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: The closest prior art does not teach the particular instant mold and matrix configuration combinations. When truncated cone shaped passages are taught and the mold is made of silicon, the method is indirect, forming solder balls on a decal for transfer rather than directly forming them on the substrate. See Gruber (USPN 5673846) and Cordes (USPN 6105852). By controlling the relationship between mold and matrix shapes and sizes, ball/pad formation can be precisely controlled.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gruber et al. (USPN 6231333 B1, single part mold), Gaynes et al. (USPN 5565033, single part mold), Hertz (USPN 6138562), Hembree (USPN 6386436 B2, molded solder, separation while molten), Yu et al (USPN 5735452, injection molded solder), Beaumont et al. (USPN 6003757, two part mold, injected solder) and Capote et al. (USPN 6297560 B1, molded solder, nitrogen reflow).

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (703)

Art Unit: 1725

306-5699. The examiner can normally be reached on Monday through Thursday from 6:30 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7718 for regular communications and (703) 305-7115 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

Lynne Edmondson
Examiner
Art Unit 1725

LRE
June 9, 2003

M. A.
PRIN